

Submitted to:

Delaware Department of Technology and Information

Contract No. DTI-08-0013



**Delaware Broadband Data and
Development**

Field Verification Report

Submitted by:



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1 Background

CBG Communications, Inc. with assistance from GeoDecisions set out to gain an understanding of the accuracy of the broadband map data created on behalf of the State of Delaware for submission to the NTIA. These maps were created based on data submitted by the known broadband providers throughout the State. These maps show where broadband is available, per provider, and therefore where broadband is not currently available.

Our first step of verification was to send the post processed broadband map data and data spreadsheets back to each of the broadband providers. The maps showed only the specific provider in order to maintain confidentiality. The providers were asked to verify that we have captured their data accurately and reflected it correctly on our maps. Any corrections provided by the providers were incorporated onto the maps.

Although GeoDecisions used care in the creation of the maps to accurately reflect each provider's service areas, and the providers were asked to verify this accuracy, the team desired a method of spot checking the providers' data to ensure we accurately reflect where broadband is and isn't available and each provider's service areas.

One process of verification is to randomly visit areas of the State where providers have indicated broadband availability in order to determine if indeed broadband is available to residents and businesses in the area. We call this process Field Verification. In addition, our team performed Speed Tests to ensure that the providers were not only offering service but were offering service that fits the classification of broadband by the NTIA's definition. This definition requires minimum speeds of 768 Kbps in the downstream direction and 200 Kbps in the upstream direction.

Our team performed speed tests where we had access to the providers' networks, primarily wireless networks, and we asked residents and businesses to perform speed tests where we could not perform the tests ourselves, primarily wireline networks. In addition, business cards, asking residents to perform speed tests, were left behind in areas where we did not find residents home in order to further enhance our findings.

Prior to beginning field verification activities, the Delaware SBDD team, lead by CBG Communications, Inc. (CBG) developed a field verification guide for use by each member of the field verification team. The guide included systematic instructions and a checklist related to verification of each broadband system, technology and service type. The guide and checklist were drafted, reviewed all State Parties and finalized prior to the beginning of field verification activities.

**Version Information**

Version Num.	Edit Date	Edited By	Comments
0.1	09/16/2010	Nielsen/Jensen	Draft Document

2 Process

To ensure uniformity of the team's approach to field verification, field team training was held immediately prior to the beginning of field verification activities. Training was for the GeoDecisions/CBG team and covered all field verification activities, including:

- Use of the field verification guide, instructions and checklist
- Understanding of technologies and service types
- Understanding of coverage characteristics
- Understanding of service attributes, including system technology type, upstream and downstream connection speeds, and other attributes required (by the NTIA) to be documented and verified.
- Use of the equipment needed for field verification activities
- Proper documentation of field verification activities
- Proper conduct for contacting citizens and business and distributing business cards

The office tutorial lasted 1 day with an additional 1 day for demonstration of field verification activities out in the field. In addition, Field Verification Experts were available throughout the field verification process to coach and discuss obstacles found during verification.

3 Team Assignments

Two person teams were utilized the first day after office and field training. From the second day on, field verification team members were expected to perform field verification activities on their own, again with support from Field Verification Experts. Each team member was provided an ID card and a letter of certification on Delaware State letterhead in order to mitigate findings early on that residents were suspicious of individuals asking them unsolicited questions. These two items proved effective in mitigating these concerns.

Team members spent a total of 19 days performing Field Verification functions including interviews and infrastructure identification at nearly 300 locations. In addition, the team performed approximately 150 speed tests of Cellular based wireless broadband provider



networks. Additionally, team members identified 87 tower locations in the State for potential broadband planning activities going forward.

4 Equipment Utilized for Field Verification

Each team member carried the following equipment in order to perform field verification activities for the various types of services:

- Laptop with Wi-Fi capability
- Cellular 3G/4G aircards (independent card for each provider) for use with laptop
- Binoculars
- GPS for verifying and documenting exact locations
- Hardcopy forms and electronic database for documenting verification data
- Identification documents (business cards, ID badges, letter from the State acknowledging that the team member is part of the verification team, for those with questions)
- Car chargers and/or DC to AC Inverters for equipment chargers
- Provider identified maps (boundary details shown) and other maps as needed
- Business cards advertising the State Speed Test and Survey web site

5 Findings Summary

Our findings during the Field Verification process show a high level of consistency between the data provided by Broadband providers and our research of these areas. However, there are areas within Census Blocks shown to have coverage where broadband does not exist. This is primarily true in the case of wireless providers' areas of coverage. Nevertheless, these areas do have broadband coverage in portions of the Census Block and therefore are considered to have availability for this Project.

The most common occurrence of this scenario is for wireless Broadband providers, such as cellular based providers. In this case, areas were found where speeds fall below those of the Broadband definition. However by moving a few hundred feet or more, broadband speeds can be achieved from the provider's network.

In areas that Wireline providers show broadband availability, the findings show a very high level of availability. This does not imply 100% availability in the Census Blocks shown to have broadband availability but rather that broadband is available within a given Census Block.



6 Verifying Coverage

Broadband system coverage was verified by sampling whether services were available at various points shown on the providers' system coverage maps randomly chosen from all of the census blocks that are within the providers' systems. Points were chosen to represent areas throughout the providers' service territory including system boundary edges and the outskirts of towns and cities. The team sample looked to provide a sampling of all broadband providers in the State including large and small providers across the state, being sure to include each of the 3 counties

Attachments A and A2 show interview and infrastructure identification locations, while team speed tests are included in the Ookla speed test documentation in Attachments C and C2

7 Speed Test and Survey

As part of the field verification process, State residents and businesses were given a business card sized handout that briefly explained the Project and pointed them to the State specific speed test and survey website. The State utilized a Project specific Ookla speed test website and survey in order to gain information on user's addresses, satisfaction and the upstream and downstream speeds associated with their broadband connection. Team members performed approximately 150 speed tests primarily on wireless networks. The locations of these speed tests are included on Attachments C and C1.

Another verification method, in addition to utilizing the above mentioned equipment and the methodologies listed below for verifying coverage and characteristics, was for team members to enter into discussions with residents in the area. Residents were asked if they know if a particular provider's service was available, if they were or had recently been a customer and if they know what speeds they could achieve. Residents often times did not know what their service level and speeds are but did know who the broadband service provider was. Questions such as how much were they paying for the service led to a better understanding of their service level. Approximately 1,400 business cards were handed to residents or left behind where nobody was available. These cards encouraged the residents to visit the State speed test and survey website, as listed on the card, to assist the State in gathering actual speed data. Thus far, nearly 350 speed tests have been performed on site by non-team members. The locations of these speed tests are combined with the speed tests performed by team members and are shown on Attachments B and B1.

8 Verifying Wireline Characteristics

Using a random sampling technique, team members searched for the physical endpoints of cable systems, telephone/DSL and fiber optic infrastructure and noted when additional infrastructure was not seen moving outward from the core either in an aerial (overhead) or underground manner. These areas were targeted for discussions with residents and speed tests as documented herein.



9 Wireless Broadband Coverage

Verification team members reviewed the provider's information and looked for network availability near the antenna site or in the middle of the provider's service area to confirm network and test equipment compatibility. Using a random sampling technique, the team member tested with pertinent gear to determine when service can no longer be achieved by the laptop, cell phone, or other wireless broadband-enabled device.

10 Connection Speeds for Wireline

For cable modem connections, Upstream and downstream connection speeds were verified using the State's speed test at locations within the providers' coverage area using the specified random sampling technique. An already installed cable modem connection was utilized, as available. These included randomly chosen business and residential locations where the business or resident was encouraged to test the service. Team members were not allowed to enter residences or to perform tests on businesses' networks for security and safety reasons. Findings were documented accordingly on electronic or paper forms. In addition, the speed test was documented via the State's Speed Test website.

For DSL and fiber optic connections, the same procedures were used as for cable modem testing. Findings were documented accordingly on paper or electronic forms.

11 Connection Speeds for Wireless

For secure, and/or fee for service Wi-Fi, an alpha numerical key, password or other authorization was requested from the service provider. The single provider in the State of Delaware chose not to cooperate in a timely enough manner to perform the validation for the 2nd data submission. In this instance, the service territory was verified using the same procedure that was used as for free Wi-Fi. Findings were documented accordingly on paper or electronic reports.

For cellular broadband 3G and 4G testing, a provider specific air card was needed in order to connect the laptop to the speed test to determine the speed of connection. Our team purchased aircards from the 5 cellular providers known to offer service in Delaware for use in the testing of coverage and speeds offered by these providers. The speed of connection was tested at randomly selected points beginning close to the providers' tower/antenna infrastructure, at a mid-point and then at the ends of the verified coverage area. Findings were documented accordingly on paper or electronic reports.

12 Exhibits

The following pages contain exhibits A, A2, B, B2 C and C2.

LatDD	LonDD	Provider
38.69978333330	-75.07756666670	Comcast
38.69161666670	-75.07680000000	Comcast
38.67170000000	-75.07170000000	Verizon
38.90623300000	-75.41091666670	Sprint
38.90206666670	-75.41075000000	Comcast
39.66100000000	-75.66100000000	ATT
39.66648333330	-75.66271666670	Sprint
39.72038333330	-75.66348333330	Sprint
39.72038333330	-75.66348333330	ATT
39.50113333330	-75.64875000000	ATT
39.50113333330	-75.64875000000	Sprint
38.80496666670	-75.27575000000	Comcast
38.79543333330	-75.28666666670	Comcast
38.78880000000	-75.30335000000	Verizon
38.52250000000	-75.06318333330	MediaCom
38.52201666670	-75.06033333330	Sprint
38.52201666670	-75.06033333330	Verizon
38.46491666670	-75.05311666670	Comcast
38.46491666670	-75.05311666670	Verizon
38.46491666670	-75.05311666670	Verizon Wireless
39.15926666670	-75.57238333330	ATT
39.15926666670	-75.57238333330	Sprint
39.15926666670	-75.57238333330	Comcast
39.15926666670	-75.57238333330	Verizon
39.18040000000	-75.58796666670	ATT
39.18040000000	-75.58796666670	Sprint
39.18106666670	-75.52860000000	Sprint
39.18110000000	-75.52863333330	ATT
39.20411666670	-75.49603333330	Comcast
39.10250000000	-75.54281666670	Sprint
39.10250000000	-75.54281666670	ATT
38.48231666670	-75.23231666670	Verizon
38.50501666670	-75.22730000000	MediaCom
38.52285000000	-75.22285000000	MediaCom
38.53436666670	-75.21248333330	Verizon
38.53436666670	-75.21248333330	Sprint
38.55483333330	-75.24133333330	Verizon
38.61588333330	-75.58875000000	Sprint
38.61588333330	-75.58875000000	Verizon
38.59721666670	-75.61483333330	Verizon
38.59721666670	-75.61483333330	Sprint
38.56853333330	-75.57335000000	Sprint
38.56853333330	-75.57335000000	Verizon
38.66550000000	-75.59693333330	Comcast
38.66523333330	-75.59666666670	Comcast
38.66510000000	-75.59618333330	Comcast
38.66520000000	-75.61083333330	Sprint
38.66520000000	-75.61083333330	Verizon

38.76476666670	-75.15595000000	Verizon
38.76440000000	-75.15525000000	Comcast
38.78180000000	-75.13650000000	Comcast
38.72440000000	-75.12563333330	Sprint
38.72440000000	-75.12563333330	ATT
38.72440000000	-75.12563333330	Verizon
38.77128333330	-75.65388333330	ATT
38.76306666670	-75.64198333330	Verizon
38.71765000000	-75.71765000000	Sprint
38.80270000000	-75.58531666670	Sprint
38.80270000000	-75.58531666670	Verizon
38.98686666670	-75.66365000000	Verizon
38.98686666670	-75.66365000000	Sprint
38.98686666670	-75.66365000000	ATT
39.02210000000	-75.64563333330	Sprint
39.08571666670	-75.61678333330	Comcast
39.10165000000	-75.63556666670	Verizon
39.10165000000	-75.63556666670	Sprint
39.10165000000	-75.63556666670	ATT
39.14686666670	-75.67130000000	ATT
39.14686666670	-75.67130000000	Sprint
39.15566666670	-75.63060000000	Verizon
39.13245000000	-75.54086666670	Verizon
39.28845000000	-75.61463333330	Sprint
39.29303333330	-75.62070000000	Sprint
39.34133333330	-75.60800000000	Sprint
39.34133333330	-75.60800000000	Verizon
39.13245000000	-75.54086666670	Sprint
39.13245000000	-75.54086666670	ATT
39.27033333330	-75.58735000000	Verizon
39.27033333330	-75.58735000000	Sprint
39.27063333330	-75.58663333330	ATT
39.28845000000	-75.61463333330	ATT
39.43561666670	-75.69373333330	Verizon
39.43561666670	-75.69373333330	ATT
39.43561666670	-75.69373333330	Sprint
39.47631666670	-75.72048333330	Verizon
39.63326666670	-75.66098333330	ATT
39.67596666670	-75.70468333330	Sprint
39.67596666670	-75.70468333330	T-Mobile
39.67596666670	-75.70468333330	Cricket
39.73516666670	-75.63361666670	T-Mobile
39.77881666670	-75.59780000000	Cricket
39.77881666670	-75.59780000000	T-Mobile
39.77881666670	-75.59780000000	Sprint
39.77881666670	-75.59780000000	Verizon
39.29186666670	-75.63151666670	Sprint
39.29186666670	-75.63151666670	Verizon
39.39101666670	-75.71823333330	Verizon

38.89251666670	-75.69101666670	Verizon
38.88923333330	-75.67901666670	Verizon
38.89278333330	-75.63633333330	Verizon
38.88893333330	-75.63503333330	Verizon
39.16213333330	-75.51716666670	Comcast
39.16213333330	-75.51716666670	Verizon
39.19615000000	-75.48116666670	Comcast
39.19615000000	-75.48116666670	Verizon
38.45948333330	-75.05060000000	Comcast
38.45948333330	-75.05060000000	Verizon
39.16196666670	-75.44625000000	Comcast
39.10178333330	-75.54826666670	Verizon
38.65360000000	-75.53511666670	ATT
38.65360000000	-75.53511666670	Sprint
38.63680000000	-75.38825000000	Verizon
38.64901666670	-75.38551666670	Comcast
39.09808333330	-75.54463333330	Verizon
38.58356666670	-75.30371666670	MediaCom
38.61393333330	-75.14621666670	Verizon
38.61393333330	-75.14621666670	ATT
38.61275000000	-75.14525000000	Verizon
38.61348333330	-75.14458333330	MediaCom
38.46251666670	-75.05201666670	ATT
38.46266666670	-75.05181666670	Comcast
38.46251666670	-75.05201666670	Verizon
38.46301666670	-75.05181666670	Verizon
38.45310000000	-75.06818333330	Verizon
38.45361666670	-75.06783333330	Comcast??
39.18116666670	-75.58981666670	Sprint
39.18116666670	-75.58981666670	ATT
39.18040000000	-75.58981666670	verizon
39.18031666670	-75.59526666670	Comcast
39.17770000000	-75.60801666670	Sprint
39.17770000000	-75.60801666670	ATT
39.10411666670	-75.40253333330	Comcast
39.10981666670	-75.54531666670	Sprint
39.10981666670	-75.54531666670	ATT
39.10456666670	-75.54903333330	Comcast
39.10368333330	-75.54943333330	Comcast
39.10098333330	-75.54905000000	Comcast
39.10026666670	-75.54901666670	Verizon
38.58628333330	-75.05933333330	Verizon
38.58628333330	-75.05933333330	MediaCom
38.57508333330	-75.06076666670	Sprint
38.57508333330	-75.06076666670	Verizon
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38.53715000000	-75.07138333330	MediaCom
38.78946666670	-75.31113333330	Comcast
38.78263333330	-75.31170000000	Comcast

38.77156666670	-75.31053333330	Verizon
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38.72083333330	-75.28473333330	Verizon
38.73110000000	-75.24803333330	Comcast
38.73110000000	-75.24803333330	Verizon
39.50113333330	-75.64873333330	Verizon
39.44898333330	-75.64876666670	ATT
39.44898333330	-75.64876666670	Sprint
39.41681666670	-75.63153333330	Verizon
39.43311666670	-75.63220000000	Verizon
38.90298333330	-75.42235000000	Verizon
38.89153333330	-75.42121666670	Comcast
38.87721666670	-75.41900000000	Comcast
38.87248333330	-75.41900000000	Sprint
39.45225000000	-75.69003333330	ATT
39.45225000000	-75.69001666670	Sprint
38.47263333330	-75.10870000000	Comcast
38.46106666670	-75.22020000000	Verizon
38.46106666670	-75.22020000000	ATT
38.46106666670	-75.22020000000	Sprint
38.74353333330	-75.18695000000	Sprint
38.74353333330	-75.18695000000	Verizon
38.74353333330	-75.18695000000	ATT
38.67638333330	-75.24076666670	MediaCom
38.65223333330	-75.21021666670	Verizon
38.65223333330	-75.21021666670	Sprint
38.54113333330	-75.59121666670	Sprint
38.54113333330	-75.59121666670	Verizon
38.54163333330	-75.59150000000	Verizon
38.55396666670	-75.54876666670	Sprint
38.55153333330	-75.44635000000	
38.57058333330	-75.34620000000	Verizon
38.57058333330	-75.34620000000	ATT
39.09808333330	-75.54463333330	Sprint
39.09808333330	-75.54463333330	ATT
39.03938333330	-75.55946666670	ATT
39.03938333330	-75.55946666670	Verizon
39.03938333330	-75.55946666670	Sprint
39.03241666670	-75.56475000000	Comcast
38.97541666670	-75.59673333330	Verizon
38.97433333330	-75.59583333330	Comcast
38.95301666670	-75.56473333330	Verizon
38.93410000000	-75.57546666670	Verizon
38.93410000000	-75.57546666670	Comcast
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39.09960000000	-75.43196666670	Comcast
39.05076666670	-75.55655000000	Comcast

39.06780000000	-75.47390000000	Comcast
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39.05775000000	-75.39915000000	Verizon
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38.90675000000	-75.42053333330	Comcast
38.90623333330	-75.42070000000	Comcast
38.90298333330	-75.41010000000	Comcast
38.90256666670	-75.41038333330	Comcast
38.90051666670	-75.41098333330	Comcast
38.88935000000	-75.42206500000	Verizon
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38.87301666670	-75.42738333330	Comcast
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39.06890000000	-75.47453333330	Sprint
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38.87395000000	-75.71740000000	Sprint
38.60611666670	-75.58925000000	Comcast
38.68148333330	-75.37918333330	Comcast
38.56843333330	-75.35561666670	MediaCom
38.58278333330	-75.28713333330	MediaCom
38.53508333330	-75.07023333330	Verizon
38.90051666670	-75.41098333330	Comcast
38.87301666670	-75.42738333330	Comcast
38.87100000000	-75.42018333330	Comcast
38.84828333330	-75.42930000000	Comcast
38.65828333330	-75.57571666670	Comcast
38.65858333330	-75.57463333330	Comcast
39.57085000000	-75.58751666670	Sprint
39.57085000000	-75.58751666670	Verizon
39.57085000000	-75.58751666670	ATT
39.67733333330	-75.68666666670	Verizon
38.90298333330	-75.41010000000	Comcast
38.90256666670	-75.41038333330	Comcast
39.71013333330	-75.56236666670	Cricket
39.71013333330	-75.56236666670	T-Mobile
39.71013333330	-75.56236666670	Verizon
39.71013333330	-75.56236666670	Sprint
39.71013333330	-75.56236666670	ATT
39.67596666670	-75.70468333330	Verizon
39.39101666670	-75.71823333330	ATT
39.57408333330	-75.59630000000	Sprint
39.57408333330	-75.59630000000	Verizon
39.57408333330	-75.59630000000	T-Mobile
39.57408333330	-75.59630000000	Cricket
39.57948333330	-75.58751666670	T-Mobile

39.48231666670	-75.65085000000	Cricket
39.48231666670	-75.65085000000	ATT
39.48231666670	-75.65085000000	T-Mobile
39.48231666670	-75.65085000000	Sprint
39.48231666670	-75.65085000000	Verizon
39.57948333330	-75.58751666670	Cricket
38.71578333330	-75.09328333330	Sprint
38.70036666670	-75.07638333330	Verizon
38.64148333330	-75.32548333330	MediaCom
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38.65360000000	-75.36845000000	Verizon
38.92830000000	-75.58051666670	Verizon
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38.77128333330	-75.65388333330	Sprint
38.77128333330	-75.65388333330	Verizon
39.00828333330	-75.57528333330	Verizon
39.03148333330	-75.56466666670	Verizon
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39.00828333330	-75.57528333330	ATT
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38.71231666670	-75.11711666670	Verizon
38.71256666670	-75.11678333330	Comcast
38.71286666670	-75.11638333330	Comcast
38.71576666670	-75.09330000000	ATT
39.17283333330	-75.50958333330	ATT
39.17283333330	-75.50958333330	Sprint
39.17390000000	-75.50780000000	Comcast
39.18635000000	-75.48890000000	Comcast
39.09696666670	-75.52331666670	Comcast
38.65900000000	-75.57385000000	Comcast
39.09223333330	-75.39818333330	Comcast
39.09223333330	-75.39818333330	verizon
38.65908333330	-75.57385000000	Comcast
38.65908333330	-75.57385000000	Sprint
38.55441666670	-75.24175000000	Verizon
38.55441666670	-75.24175000000	MediaCom
39.20435000000	-75.49928333330	Verizon
39.16498333330	-75.49765000000	Comcast
39.16220000000	-75.44635000000	Verizon
39.57930000000	-75.73945000000	Verizon
39.41491666670	-75.71701666670	Verizon
39.57668333330	-75.59718333330	Verizon
39.43885000000	-75.69316666670	Verizon
39.45745000000	-75.65968333330	Verizon
39.40111666670	-75.68890000000	Verizon
39.27235000000	-75.59845000000	Verizon
39.23483333330	-75.58230000000	Verizon

39.13496666670	-75.54346666670	Verizon
39.14558333330	-75.53341666670	Verizon
38.45948333330	-75.05060000000	Verizon
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39.78012400000	-75.69078300000	Comcast Cable Communications LLC.
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39.56299200000	-75.74072700000	Verizon Delaware, LLC
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39.74416100000	-75.57484900000	Comcast Cable Communications LLC.
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39.57731700000	-75.58903200000	Atlantic Broadband (Delmar), LLC
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39.38598300000	-75.63626800000	Atlantic Broadband (Delmar), LLC
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39.57903900000	-75.58881900000	Verizon Delaware, LLC
39.51625600000	-75.57712200000	
39.79905700000	-75.46381700000	Comcast Cable Communications LLC.
39.76139900000	-75.56628400000	
39.74792700000	-75.54673800000	Level 3 Communications, LLC
39.33047800000	-75.64105700000	Atlantic Broadband (Delmar), LLC
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39.71910700000	-75.61234800000	Verizon Delaware, LLC
39.78893600000	-75.69834900000	Comcast Cable Communications LLC.
39.78738700000	-75.69585600000	Comcast Cable Communications LLC.
39.80683500000	-75.67578100000	Verizon Delaware, LLC
39.72273900000	-75.66048800000	AT&T Corp, Inc.
39.73737100000	-75.62314800000	AT&T Corp, Inc.
39.68745300000	-75.72752100000	Comcast Cable Communications LLC.
39.30746400000	-75.60792200000	AT&T Corp, Inc.



Delaware

N
0 5 10 15 Miles
Field Verification Interview Points

● Field Verification Interview Point



ISP	Download Speed	Upload speed	Client Latitude	Client Longitude	Latency ms.	PROVIDER
University of Delaware	62973	38785	39.5645	-75.5970	6.0	Comcast
Verizon Internet Services	30301	18492	39.6680	-75.7134	20.0	Verizon FiOS
Comcast Cable	20741	3462	39.7151	-75.7306	19.0	Comcast
Comcast Cable	13112	1546	39.1703	-75.5456	21.0	Comcast
HUGHES NETWORK SYSTEMS	1186	129	38.0000	-97.0000	929.0	HughesNet
HUGHES NETWORK SYSTEMS	1343	272	38.0000	-97.0000	970.0	HughesNet
Verizon Internet Services	30555	19834	39.7151	-75.7306	20.0	Verizon FiOS
Cellco Partnership DBA Verizon Wireless	159	249	39.8686	-75.3958	161.0	Verizon
Cellco Partnership DBA Verizon Wireless	167	237	39.8686	-75.3958	138.0	Verizon
Cellco Partnership DBA Verizon Wireless	384	243	39.8686	-75.3958	228.0	Verizon
Sprint PCS	498	102	40.7600	-73.8276	118.0	Sprint
Sprint PCS	603	80	40.7600	-73.8276	135.0	Sprint
T-MOBILE USA	205	167	39.0504	-76.9055	281.0	T-Mobile
CRICKET COMMUNICATIONS	430	278	39.9968	-75.1485	125.0	Cricket
CRICKET COMMUNICATIONS	737	154	39.9968	-75.1485	112.0	Cricket
CRICKET COMMUNICATIONS	843	328	39.9968	-75.1485	109.0	Cricket
CRICKET COMMUNICATIONS	2090	690	39.9968	-75.1485	112.0	Cricket
CRICKET COMMUNICATIONS	2344	648	39.9968	-75.1485	100.0	Cricket
CRICKET COMMUNICATIONS	2152	673	39.9968	-75.1485	89.0	Cricket
T-MOBILE USA	360	720	40.1545	-75.3809	135.0	T-Mobile
Sprint PCS	831	407	39.3675	-76.2961	99.0	Sprint
T-MOBILE USA	456	719	40.1545	-75.3809	143.0	T-Mobile
Sprint PCS	789	375	39.3675	-76.2961	104.0	Sprint
T-MOBILE USA	281	599	40.1545	-75.3809	132.0	T-Mobile
Sprint PCS	1010	355	39.3675	-76.2961	104.0	Sprint
Cellco Partnership DBA Verizon Wireless	668	413	40.1142	-76.5088	137.0	Verizon
Cellco Partnership DBA Verizon Wireless	614	452	40.1142	-76.5088	144.0	Verizon
Cellco Partnership DBA Verizon Wireless	407	468	40.1142	-76.5088	144.0	Verizon
Service Provider Corporation	3815	1501	38.0000	-97.0000	134.0	AT&T
Cellco Partnership DBA Verizon Wireless	527	436	40.1142	-76.5088	142.0	Verizon
Service Provider Corporation	4006	1544	38.0000	-97.0000	126.0	AT&T
Service Provider Corporation	3607	1462	38.0000	-97.0000	132.0	AT&T
Cellco Partnership DBA Verizon Wireless	607	508	40.1142	-76.5088	157.0	Verizon
Sprint PCS	2150	565	39.3675	-76.2961	107.0	Sprint
Sprint PCS	2118	444	39.3675	-76.2961	106.0	Sprint
Cellco Partnership DBA Verizon Wireless	312	512	40.1142	-76.5088	137.0	Verizon
Sprint PCS	1841	502	39.3675	-76.2961	104.0	Sprint
Cellco Partnership DBA Verizon Wireless	719	512	40.1142	-76.5088	267.0	Verizon
T-MOBILE USA	4230	808	40.1545	-75.3809	128.0	T-Mobile
T-MOBILE USA	4166	768	40.1545	-75.3809	124.0	T-Mobile
T-MOBILE USA	5334	782	40.1545	-75.3809	116.0	T-Mobile
CRICKET COMMUNICATIONS	852	656	39.9968	-75.1485	90.0	Cricket
CRICKET COMMUNICATIONS	2236	453	39.9968	-75.1485	119.0	Cricket
CRICKET COMMUNICATIONS	2045	571	39.9968	-75.1485	95.0	Cricket
Service Provider Corporation	1213	1304	38.0000	-97.0000	130.0	AT&T
Service Provider Corporation	2149	1572	38.0000	-97.0000	146.0	AT&T
Cellco Partnership DBA Verizon Wireless	1018	299	40.1767	-76.4297	138.0	Verizon
Cellco Partnership DBA Verizon Wireless	805	298	40.1767	-76.4297	130.0	Verizon
Cellco Partnership DBA Verizon Wireless	770	570	40.1767	-76.4297	172.0	Verizon
Sprint PCS	553	254	40.7619	-73.9763	204.0	Sprint
Sprint PCS	331	263	40.7619	-73.9763	106.0	Sprint
Service Provider Corporation	2001	1256	38.0000	-97.0000	134.0	AT&T

Service Provider Corporation	1617	741	38.0000	-97.0000	179.0	AT&T
Cellco Partnership DBA Verizon Wireless	1244	534	40.1767	-76.4297	120.0	Verizon
Service Provider Corporation	620	938	38.0000	-97.0000	174.0	AT&T
Cellco Partnership DBA Verizon Wireless	1633	542	40.1767	-76.4297	132.0	Verizon
AT&T Global Network Services, LLC	1713	1457	40.5177	-80.5913	121.0	AT&T
AT&T Global Network Services, LLC	1432	1415	40.5177	-80.5913	123.0	AT&T
AT&T Global Network Services, LLC	1793	1554	40.5177	-80.5913	138.0	AT&T
Sprint PCS	1316	276	40.6931	-73.8575	136.0	Sprint
Cellco Partnership DBA Verizon Wireless	1507	532	40.1767	-76.4297	143.0	Verizon
Sprint PCS	137	99	40.6931	-73.8575	1016.0	Sprint
Sprint PCS	987	261	40.6931	-73.8575	112.0	Sprint
Cellco Partnership DBA Verizon Wireless	1329	566	40.1767	-76.4297	131.0	Verizon
Sprint PCS	808	105	39.5235	-78.0704	121.0	Sprint
Sprint PCS	658	210	39.5235	-78.0704	185.0	Sprint
Sprint PCS	1264	152	39.5235	-78.0704	174.0	Sprint
Sprint PCS	221	76	39.5235	-78.0704	1037.0	Sprint
Service Provider Corporation	2121	1078	38.0000	-97.0000	139.0	AT&T
Service Provider Corporation	2513	738	38.0000	-97.0000	131.0	AT&T
Service Provider Corporation	2283	1013	38.0000	-97.0000	139.0	AT&T
Service Provider Corporation	3638	1447	38.0000	-97.0000	121.0	AT&T
Service Provider Corporation	3659	1567	38.0000	-97.0000	117.0	AT&T
Service Provider Corporation	4035	1423	38.0000	-97.0000	124.0	AT&T
Cellco Partnership DBA Verizon Wireless	389	294	39.9984	-75.2712	130.0	Verizon
Sprint PCS	2404	671	39.5235	-78.0704	93.0	Sprint
Cellco Partnership DBA Verizon Wireless	500	288	39.9984	-75.2712	135.0	Verizon
Sprint PCS	2649	553	39.5235	-78.0704	108.0	Sprint
Cellco Partnership DBA Verizon Wireless	615	385	39.9984	-75.2712	120.0	Verizon
Sprint PCS	1467	536	39.5235	-78.0704	91.0	Sprint
Cellco Partnership DBA Verizon Wireless	351	149	39.9984	-75.2712	125.0	Verizon
Comcast Cable	21171	4602	39.7151	-75.7306	25.0	Comcast
Verizon Internet Services	37704	15286	39.4757	-75.6724	21.0	Verizon
Verizon Internet Services	34042	19816	39.4757	-75.6724	21.0	Verizon
UUNET Technologies	24	356	39.9968	-75.1485	183.0	Verizon
UUNET Technologies	24	325	39.9968	-75.1485	182.0	Verizon
UUNET Technologies	24	319	39.9968	-75.1485	198.0	Verizon
Comcast Cable	21213	3169	39.1817	-75.5971	10.0	Comcast
Cellco Partnership DBA Verizon Wireless	180	67	40.3375	-75.9445	141.0	Verizon
Cellco Partnership DBA Verizon Wireless	1525	575	40.1246	-75.5385	156.0	Verizon
Sprint PCS	702	165	40.6525	-73.9554	130.0	Sprint
Cellco Partnership DBA Verizon Wireless	1149	430	40.1246	-75.5385	186.0	Verizon
Sprint PCS	1200	271	40.6525	-73.9554	145.0	Sprint
Sprint PCS	2309	658	39.3181	-76.6140	106.0	Sprint
Cellco Partnership DBA Verizon Wireless	127	92	40.4180	-75.5157	888.0	Verizon
Sprint PCS	2791	516	39.3181	-76.6140	106.0	Sprint
Sprint PCS	2994	663	39.3181	-76.6140	101.0	Sprint
Cellco Partnership DBA Verizon Wireless	367	75	40.4180	-75.5157	161.0	Verizon
AT&T Global Network Services, LLC	218	75	39.4918	-76.6328	578.0	AT&T
Cellco Partnership DBA Verizon Wireless	168	72	40.2269	-75.6452	168.0	Verizon
Sprint PCS	970	312	41.0404	-74.3010	107.0	Sprint
Sprint PCS	1167	146	41.0404	-74.3010	112.0	Sprint
Sprint PCS	1050	371	41.0404	-74.3010	126.0	Sprint
AT&T Global Network Services, LLC	187	119	38.6385	-90.3026	592.0	AT&T
AT&T Global Network Services, LLC	177	86	38.6385	-90.3026	533.0	AT&T
Sprint PCS	1409	578	40.5865	-74.1497	98.0	Sprint
Sprint PCS	962	551	40.5865	-74.1497	105.0	Sprint

Cellco Partnership DBA Verizon Wireless	1395	477	39.9571	-76.7055	143.0	Verizon
Sprint PCS	1029	647	40.5865	-74.1497	106.0	Sprint
Cellco Partnership DBA Verizon Wireless	659	508	39.9571	-76.7055	140.0	Verizon
Cellco Partnership DBA Verizon Wireless	1236	59	40.8483	-73.9725	162.0	Verizon
Cellco Partnership DBA Verizon Wireless	1372	308	40.8483	-73.9725	155.0	Verizon
Cellco Partnership DBA Verizon Wireless	1452	220	40.8483	-73.9725	161.0	Verizon
Cellco Partnership DBA Verizon Wireless	506	154	40.8483	-73.9725	206.0	Verizon
Sprint PCS	1194	407	40.6195	-74.4247	114.0	Sprint
Sprint PCS	1255	469	40.6195	-74.4247	112.0	Sprint
Comcast Cable	20679	4410	38.6886	-75.0733	19.0	Comcast
Verizon Internet Services	1506	374	39.9968	-75.1485	48.0	Verizon
Sprint PCS	1036	141	40.6195	-74.4247	109.0	Sprint
Sprint PCS	1026	142	40.6195	-74.4247	101.0	Sprint
Miacom Communications Corp.	9601	940	38.5608	-75.3351	61.0	MediaCom
Comcast Cable	13220	4623	38.6680	-75.3973	21.0	Comcast
Comcast Cable	13108	4603	38.6680	-75.3973	21.0	Comcast
Comcast Business Communications	20233	1568	39.9968	-75.1485	23.0	Verizon
Comcast Business Communications	21289	1504	39.9968	-75.1485	22.0	Verizon
Cellco Partnership DBA Verizon Wireless	2308	570	39.8684	-75.2223	124.0	Verizon
Cellco Partnership DBA Verizon Wireless	2352	486	39.8684	-75.2223	138.0	Verizon
Verizon Internet Services	752	135	39.9968	-75.1485	62.0	Verizon
Verizon Internet Services	744	131	39.9968	-75.1485	61.0	Verizon
Sprint PCS	1096	456	39.9566	-75.6162	101.0	Sprint
Sprint PCS	1138	585	39.9566	-75.6162	94.0	Sprint
Sprint PCS	1371	412	39.9566	-75.6162	104.0	Sprint
Sprint PCS	1540	439	39.9566	-75.6162	107.0	Sprint
Sprint PCS	1489	384	39.9566	-75.6162	105.0	Sprint
Cellco Partnership DBA Verizon Wireless	233	381	40.4639	-75.3263	150.0	Verizon
AT&T Global Network Services, LLC	131	66	39.5930	-77.0109	520.0	AT&T
Level 3 Communications	29	243	38.8240	-75.6011	213.0	Earthlink
Service Provider Corporation	73	50	38.0000	-97.0000	539.0	AT&T
Sprint PCS	873	571	40.4452	-74.5587	108.0	Sprint
Cellco Partnership DBA Verizon Wireless	155	125	40.6361	-75.3649	202.0	Verizon
Sprint PCS	1209	622	40.4452	-74.5587	101.0	Sprint
Sprint PCS	1072	567	40.4452	-74.5587	107.0	Sprint
Sprint PCS	726	456	39.4053	-76.4436	106.0	Sprint
Sprint PCS	727	676	39.4053	-76.4436	117.0	Sprint
Sprint PCS	827	555	39.4053	-76.4436	109.0	Sprint
Cellco Partnership DBA Verizon Wireless	1273	501	40.2933	-75.7441	143.0	Verizon
Cellco Partnership DBA Verizon Wireless	1230	464	40.2933	-75.7441	139.0	Verizon
Cellco Partnership DBA Verizon Wireless	1142	458	40.2933	-75.7441	131.0	Verizon
Cellco Partnership DBA Verizon Wireless	2504	586	40.2489	-75.1498	132.0	Verizon
Sprint PCS	1119	592	39.3181	-76.6140	109.0	Sprint
Cellco Partnership DBA Verizon Wireless	2514	644	40.2489	-75.1498	139.0	Verizon
Sprint PCS	1126	626	39.3181	-76.6140	108.0	Sprint
Sprint PCS	1277	477	39.3181	-76.6140	101.0	Sprint
Cellco Partnership DBA Verizon Wireless	2066	662	40.2489	-75.1498	124.0	Verizon
Comcast Cable	8142	4217	38.6320	-75.5901	22.0	Comcast
Sprint PCS	1457	413	40.4981	-74.5245	98.0	Sprint
Sprint PCS	1121	415	40.4981	-74.5245	117.0	Sprint
Cellco Partnership DBA Verizon Wireless	451	359	41.0715	-75.1278	148.0	Verizon
Sprint PCS	1280	429	40.4981	-74.5245	109.0	Sprint
Cellco Partnership DBA Verizon Wireless	344	452	41.0715	-75.1278	140.0	Verizon
Cellco Partnership DBA Verizon Wireless	393	326	41.0715	-75.1278	151.0	Verizon
Service Provider Corporation	3752	714	38.0000	-97.0000	137.0	AT&T

Service Provider Corporation	4396	859	38.0000	-97.0000	124.0	AT&T
Service Provider Corporation	4448	754	38.0000	-97.0000	129.0	AT&T
AT&T Global Network Services, LLC	2533	1456	40.1768	-83.0792	118.0	AT&T
AT&T Global Network Services, LLC	2629	1470	40.1768	-83.0792	124.0	AT&T
AT&T Global Network Services, LLC	2965	1595	40.1768	-83.0792	129.0	AT&T
Cellco Partnership DBA Verizon Wireless	1416	584	40.5301	-75.1249	145.0	Verizon
Sprint PCS	1594	446	40.4981	-74.5245	101.0	Sprint
Cellco Partnership DBA Verizon Wireless	1382	618	40.5301	-75.1249	155.0	Verizon
Sprint PCS	2149	563	40.4981	-74.5245	101.0	Sprint
Cellco Partnership DBA Verizon Wireless	1351	446	40.5301	-75.1249	145.0	Verizon
HUGHES NETWORK SYSTEMS	801	144	38.0000	-97.0000	886.0	HughesNet
HUGHES NETWORK SYSTEMS	800	151	38.0000	-97.0000	808.0	HughesNet
Comcast Cable	16383	4040	39.6025	-75.6945	22.0	Comcast
Verizon Internet Services	2873	729	39.9968	-75.1485	52.0	Verizon
Sprint PCS	1447	734	39.0907	-76.8398	111.0	Sprint
Sprint PCS	2114	626	39.0907	-76.8398	109.0	Sprint
Sprint PCS	1188	699	39.0907	-76.8398	108.0	Sprint
AT&T Global Network Services, LLC	2579	614	40.0070	-75.3177	127.0	AT&T
Cellco Partnership DBA Verizon Wireless	1338	385	40.7923	-74.1001	153.0	Verizon
AT&T Global Network Services, LLC	2768	1386	40.0070	-75.3177	121.0	AT&T
Cellco Partnership DBA Verizon Wireless	1245	468	40.7923	-74.1001	139.0	Verizon
Service Provider Corporation	3421	1570	38.0000	-97.0000	131.0	AT&T
Service Provider Corporation	3654	1570	38.0000	-97.0000	138.0	AT&T
Service Provider Corporation	3461	1573	38.0000	-97.0000	132.0	AT&T
Sprint PCS	84	107	39.9078	-75.3251	139.0	Sprint
Cellco Partnership DBA Verizon Wireless	135	68	40.7923	-74.1001	957.0	Verizon
Cellco Partnership DBA Verizon Wireless	137	96	40.7923	-74.1001	191.0	Verizon
Sprint PCS	994	414	39.9078	-75.3251	114.0	Sprint
Cellco Partnership DBA Verizon Wireless	2129	584	40.7923	-74.1001	151.0	Verizon
Sprint PCS	917	504	39.9078	-75.3251	109.0	Sprint
Cellco Partnership DBA Verizon Wireless	1649	507	40.7923	-74.1001	154.0	Verizon
Cellco Partnership DBA Verizon Wireless	2705	651	40.7923	-74.1001	147.0	Verizon
Sprint PCS	1176	570	39.2004	-74.7051	106.0	Sprint
Cellco Partnership DBA Verizon Wireless	724	453	39.9968	-75.1485	152.0	Verizon
Sprint PCS	1082	513	39.2004	-74.7051	107.0	Sprint
Cellco Partnership DBA Verizon Wireless	838	645	39.9968	-75.1485	148.0	Verizon
Cellco Partnership DBA Verizon Wireless	697	536	39.9968	-75.1485	151.0	Verizon
AT&T Global Network Services, LLC	2675	1577	43.0708	-78.8201	124.0	AT&T
AT&T Global Network Services, LLC	2248	1683	43.0708	-78.8201	135.0	AT&T
AT&T Global Network Services, LLC	218	43	39.9741	-86.1272	551.0	AT&T
AT&T Global Network Services, LLC	172	55	39.9741	-86.1272	587.0	AT&T
Cellco Partnership DBA Verizon Wireless	1427	543	39.9968	-75.1485	132.0	Verizon
Sprint PCS	1547	352	40.7245	-74.0621	102.0	Sprint
Cellco Partnership DBA Verizon Wireless	1476	556	39.9968	-75.1485	141.0	Verizon
Sprint PCS	1586	408	40.7245	-74.0621	114.0	Sprint
Sprint PCS	1792	358	40.7245	-74.0621	115.0	Sprint
Sprint PCS	667	377	40.6884	-73.8227	126.0	Sprint
Sprint PCS	1164	372	40.6884	-73.8227	118.0	Sprint
Sprint PCS	988	461	40.6884	-73.8227	98.0	Sprint
Verizon Internet Services	732	133	39.9968	-75.1485	70.0	Verizon
Verizon Internet Services	731	130	39.9968	-75.1485	68.0	Verizon
Verizon Internet Services	5314	1836	39.7976	-75.5392	26.0	Verizon
Sprint PCS	894	393	40.8499	-73.8769	85.0	Sprint
Cellco Partnership DBA Verizon Wireless	624	91	39.9968	-75.1485	143.0	Verizon
Cellco Partnership DBA Verizon Wireless	574	407	39.9968	-75.1485	159.0	Verizon

Cellco Partnership DBA Verizon Wireless	666	527	39.9968	-75.1485	151.0	Verizon
Sprint PCS	479	456	40.8499	-73.8769	113.0	Sprint
Cellco Partnership DBA Verizon Wireless	1465	582	39.9968	-75.1485	140.0	Verizon
Sprint PCS	618	347	40.8499	-73.8769	102.0	Sprint
Cellco Partnership DBA Verizon Wireless	952	501	39.9968	-75.1485	147.0	Verizon
Sprint PCS	657	453	40.8499	-73.8769	88.0	Sprint
Cellco Partnership DBA Verizon Wireless	1199	559	40.3375	-75.9445	143.0	Verizon
Sprint PCS	1010	393	40.6525	-73.9554	100.0	Sprint
Cellco Partnership DBA Verizon Wireless	1543	552	40.3375	-75.9445	147.0	Verizon
Sprint PCS	855	419	40.6525	-73.9554	105.0	Sprint
Cellco Partnership DBA Verizon Wireless	823	547	40.3375	-75.9445	140.0	Verizon
Cellco Partnership DBA Verizon Wireless	1195	541	40.3375	-75.9445	144.0	Verizon
Sprint PCS	1565	349	40.6525	-73.9554	119.0	Sprint
Cellco Partnership DBA Verizon Wireless	717	597	40.3375	-75.9445	143.0	Verizon
Sprint PCS	957	176	40.6525	-73.9554	104.0	Sprint
Sprint PCS	480	131	40.6525	-73.9554	145.0	Sprint
Cellco Partnership DBA Verizon Wireless	914	470	40.3375	-75.9445	139.0	Verizon
Sprint PCS	539	254	40.6525	-73.9554	106.0	Sprint
Sprint PCS	770	329	40.6525	-73.9554	136.0	Sprint
Cellco Partnership DBA Verizon Wireless	840	520	40.3375	-75.9445	112.0	Verizon
Cellco Partnership DBA Verizon Wireless	881	535	40.3375	-75.9445	112.0	Verizon
Sprint PCS	681	244	40.6525	-73.9554	146.0	Sprint
Cellco Partnership DBA Verizon Wireless	583	430	40.3375	-75.9445	136.0	Verizon
Comcast Cable	20986	4411	38.6320	-75.5901	36.0	Comcast
Comcast Cable	21141	4494	38.6320	-75.5901	36.0	Comcast
Sprint PCS	336	4	40.7619	-73.9763	623.0	Sprint
Verizon Internet Services	13417	12412	39.6680	-75.7134	27.0	Verizon
Verizon Internet Services	12464	12349	39.6680	-75.7134	27.0	Verizon
Verizon Internet Services	13208	13110	39.6680	-75.7134	23.0	Verizon
Sprint PCS	977	389	40.7619	-73.9763	105.0	Sprint
Cellco Partnership DBA Verizon Wireless	1945	560	40.2976	-75.4413	117.0	Verizon
Sprint PCS	1123	417	40.7619	-73.9763	106.0	Sprint
Sprint PCS	601	344	40.7619	-73.9763	570.0	Sprint
Cellco Partnership DBA Verizon Wireless	1143	654	40.2976	-75.4413	109.0	Verizon
STATE OF DELAWARE	75855	18076	39.1703	-75.5456	21.0	Verizon
Verizon Internet Services	30545	16122	39.7850	-75.6823	26.0	Verizon
Verizon Internet Services	30362	15861	39.7850	-75.6823	24.0	Verizon
Verizon Internet Services	30541	16057	39.7850	-75.6823	25.0	Verizon
Sprint PCS	1857	571	39.3181	-76.6140	94.0	Sprint
Sprint PCS	2137	519	39.3181	-76.6140	95.0	Sprint
Comcast Cable	13129	4383	39.1703	-75.5456	10.0	Comcast
Comcast Cable	13391	4434	39.1703	-75.5456	10.0	Comcast
Sprint PCS	1431	393	41.4324	-73.7167	107.0	Sprint
Sprint PCS	1071	609	41.4324	-73.7167	117.0	Sprint
Sprint PCS	411	17	41.4324	-73.7167	233.0	Sprint
Sprint PCS	1250	17	39.9500	-74.9929	280.0	Sprint
Verizon Internet Services	20778	5146	39.6680	-75.7134	27.0	Verizon FIOS
Sprint PCS	1182	339	40.3754	-74.1712	105.0	Sprint
Sprint PCS	1044	486	40.3754	-74.1712	93.0	Sprint
Cellco Partnership DBA Verizon Wireless	2326	519	40.0178	-74.9449	83.0	Verizon
Comcast Cable	21167	3933	39.1703	-75.5456	16.0	Comcast
Verizon Internet Services	18753	5272	39.7151	-75.7306	26.0	Verizon
Verizon Internet Services	17924	5392	39.7151	-75.7306	28.0	Verizon
Comcast Cable	9602	4462	39.7592	-75.5664	17.0	Comcast
Comcast Cable	9567	4455	39.7592	-75.5664	17.0	Comcast

Comcast Cable	9650	4446	39.7592	-75.5664	17.0	Comcast
AT&T WorldNet Services	1167	971	39.7151	-75.7306	12.0	Studio Green
University of Delaware	81479	32685	39.5645	-75.5970	10.0	UDEL
Sprint PCS	1275	605	40.7235	-73.8612	118.0	Sprint
Service Provider Corporation	2511	1201	38.0000	-97.0000	144.0	AT&T
Sprint PCS	1158	795	40.7235	-73.8612	102.0	Sprint
Sprint PCS	1035	651	40.7235	-73.8612	105.0	Sprint
Service Provider Corporation	2579	1125	38.0000	-97.0000	167.0	AT&T
Service Provider Corporation	2584	742	38.0000	-97.0000	191.0	AT&T
AT&T Global Network Services, LLC	2200	353	41.4789	-81.6473	110.0	AT&T
AT&T Global Network Services, LLC	2358	703	41.4789	-81.6473	141.0	AT&T
Service Provider Corporation	5663	1424	38.0000	-97.0000	117.0	AT&T
Service Provider Corporation	6256	1352	38.0000	-97.0000	118.0	AT&T
Sprint PCS	2468	665	40.7245	-74.0621	101.0	Sprint
Sprint PCS	790	135	38.8061	-76.8754	96.0	Sprint
Sprint PCS	768	118	38.8061	-76.8754	110.0	Sprint
Comcast Cable	7611	4411	39.1703	-75.5456	25.0	Comcast
Verizon Internet Services	16477	4680	39.6680	-75.7134	31.0	Verizon
Nemours Children's Clinic	9644	16481	39.7592	-75.5664	45.0	Comcast
Comcast Cable	24107	4420	39.6734	-75.7052	24.0	Comcast
Comcast Cable	24767	4433	39.6734	-75.7052	24.0	Comcast
Sprint PCS	805	421	39.9968	-75.1485	90.0	Sprint
Sprint PCS	1377	454	39.9968	-75.1485	95.0	Sprint
Verizon Internet Services	16644	5130	39.7151	-75.7306	20.0	Verizon
Comcast Cable	6506	3085	39.1703	-75.5456	25.0	Comcast
Verizon Internet Services	588	134	39.9968	-75.1485	87.0	Verizon
Verizon Internet Services	2857	715	39.9968	-75.1485	48.0	Verizon
Comcast Business Communications	12750	4231	38.3384	-75.1249	26.0	Verizon
Verizon Internet Services	746	134	39.9968	-75.1485	88.0	Verizon
Verizon Internet Services	747	131	39.9968	-75.1485	88.0	Verizon
Mediacom Communications Corp.	9543	941	38.5608	-75.3351	62.0	MediaCom
Mediacom Communications Corp.	9488	938	38.5608	-75.3351	59.0	MediaCom
Mediacom Communications Corp.	9524	927	38.5608	-75.3351	61.0	MediaCom
Verizon Internet Services	18962	18940	39.6680	-75.7134	19.0	Verizon FIOS
Comcast Cable	5024	3819	38.9418	-75.3676	26.0	Comcast
Comcast Cable	5029	3847	38.9418	-75.3676	26.0	Comcast
Comcast Cable	21118	4176	38.3384	-75.1249	21.0	Comcast
Verizon Internet Services	742	135	39.9968	-75.1485	72.0	Verizon
Verizon Internet Services	745	135	39.9968	-75.1485	77.0	Verizon
Sprint PCS	1113	394	39.7691	-75.8002	107.0	Sprint
Sprint PCS	1023	412	39.7691	-75.8002	101.0	Sprint
Comcast Cable	22636	4529	38.9418	-75.3676	20.0	Comcast
Sprint PCS	1182	515	39.2581	-77.8705	108.0	Sprint
Sprint PCS	1626	582	39.2581	-77.8705	104.0	Sprint
AT&T Global Network Services, LLC	166	66	41.2910	-82.2277	526.0	AT&T
Sprint PCS	1174	651	40.7619	-73.9763	103.0	Sprint
Sprint PCS	128	77	40.7619	-73.9763	1112.0	Sprint
Cellco Partnership DBA Verizon Wireless	734	455	40.0306	-76.2983	145.0	Verizon
Sprint PCS	919	363	40.7619	-73.9763	97.0	Sprint
Cellco Partnership DBA Verizon Wireless	921	362	40.0306	-76.2983	146.0	Verizon
Sprint PCS	768	121	39.0907	-76.8398	107.0	Sprint
Sprint PCS	720	40	39.0907	-76.8398	112.0	Sprint
AT&T Global Network Services, LLC	4461	1506	38.6385	-90.3026	112.0	AT&T
AT&T Global Network Services, LLC	3644	1482	38.6385	-90.3026	131.0	AT&T
Cellco Partnership DBA Verizon Wireless	534	375	41.0951	-76.2619	174.0	Verizon

Cellco Partnership DBA Verizon Wireless	375	517	41.0951	-76.2619	187.0	Verizon
Comcast Business Communications	5209	4351	39.5350	-74.6250	18.0	Comcast
Comcast Business Communications	6315	4455	39.5350	-74.6250	24.0	Comcast
Sprint PCS	839	262	39.9500	-74.9929	106.0	Sprint
Sprint PCS	2502	537	39.3892	-76.4920	106.0	Sprint
Sprint PCS	2233	571	39.3892	-76.4920	102.0	Sprint
Service Provider Corporation	4540	870	38.0000	-97.0000	111.0	AT&T
Service Provider Corporation	4449	1007	38.0000	-97.0000	106.0	AT&T
Cellco Partnership DBA Verizon Wireless	1298	579	39.9571	-76.7055	116.0	Verizon
Cellco Partnership DBA Verizon Wireless	1114	515	39.9571	-76.7055	103.0	Verizon
Cellco Partnership DBA Verizon Wireless	274	510	40.1030	-74.9415	142.0	Verizon
Cellco Partnership DBA Verizon Wireless	399	524	40.1030	-74.9415	141.0	Verizon
Cellco Partnership DBA Verizon Wireless	379	465	40.1030	-74.9415	135.0	Verizon
Sprint PCS	1290	417	40.1002	-75.7562	91.0	Sprint
Sprint PCS	881	612	40.1002	-75.7562	77.0	Sprint
Sprint PCS	1030	415	40.0721	-74.2069	96.0	Sprint
Sprint PCS	905	387	40.0721	-74.2069	84.0	Sprint
AT&T Global Network Services, LLC	309	472	40.0652	-76.6854	115.0	AT&T
AT&T Global Network Services, LLC	383	1120	40.0652	-76.6854	135.0	AT&T
T-MOBILE USA	102	65	39.0504	-76.9055	225.0	T-Mobile
Cellco Partnership DBA Verizon Wireless	1618	564	39.8925	-75.3704	114.0	Verizon
Cellco Partnership DBA Verizon Wireless	1873	657	39.8925	-75.3704	119.0	Verizon
Sprint PCS	849	423	39.4632	-77.9521	113.0	Sprint
Sprint PCS	551	319	39.4632	-77.9521	107.0	Sprint
AT&T Global Network Services, LLC	5065	1449	40.0070	-75.3177	136.0	AT&T
AT&T Global Network Services, LLC	5216	1336	40.0070	-75.3177	128.0	AT&T
AT&T Global Network Services, LLC	195	1194	41.1741	-81.4389	147.0	AT&T
AT&T Global Network Services, LLC	164	1176	41.1741	-81.4389	174.0	AT&T
Sprint PCS	587	467	39.9968	-75.1485	105.0	Sprint
Sprint PCS	483	300	39.9968	-75.1485	95.0	Sprint
Sprint PCS	1684	529	41.1181	-74.0833	99.0	Sprint
Sprint PCS	1479	530	41.1181	-74.0833	105.0	Sprint
AT&T Global Network Services, LLC	900	1198	40.2379	-76.9228	135.0	AT&T
AT&T Global Network Services, LLC	1320	1135	40.2379	-76.9228	123.0	AT&T
T-MOBILE USA	4846	747	40.1545	-75.3809	57.0	T-Mobile
T-MOBILE USA	3461	604	40.1545	-75.3809	73.0	T-Mobile
Comcast Cable	15038	4320	39.2955	-75.5698	20.0	Comcast
STATE OF DELAWARE	72403	13138	39.1703	-75.5456	18.0	Verizon
Comcast Cable	14717	3341	39.6155	-75.7044	20.0	Comcast
University of Delaware	69126	39154	39.5645	-75.5970	10.0	Comcast
Comcast Cable	19625	3049	39.7351	-75.6684	41.0	Comcast
Comcast Cable	18500	3099	39.7351	-75.6684	37.0	Comcast
Comcast Cable	18830	3755	39.7351	-75.6684	41.0	Comcast
WAYPORT	402	354	40.1009	-75.6410	71.0	AT&T
Atlantic Broadband	7324	433	39.3813	-75.6402	11.0	Atlantic
Comcast Cable	187	1460	39.6680	-75.7134	26.0	Comcast
Comcast Cable	3170	2973	39.7187	-75.6216	24.0	Comcast
STATE OF DELAWARE	57378	10827	39.7592	-75.5664	20.0	Verizon
STATE OF DELAWARE	64792	10424	39.7592	-75.5664	19.0	Verizon
Verizon Internet Services	4259	3394	39.4757	-75.6724	26.0	Verizon
Comcast Cable	3341	3193	39.7592	-75.5664	11.0	Comcast
DELAWARE STATE UNIVERSITY	1196	138	39.1588	-75.4941	11.0	c
Comcast Cable	2430	1157	39.8041	-75.4559	26.0	Comcast
Comcast Cable	4374	3350	39.8041	-75.4559	26.0	Comcast
Atlantic Broadband	8791	957	39.3813	-75.6402	11.0	Atlantic

Atlantic Broadband	3462	808	39.3813	-75.6402	11.0	Atlantic
Atlantic Broadband	1634	291	39.3813	-75.6402	26.0	Atlantic
Comcast Cable	316	1012	40.1172	-74.8495	73.0	Comcast
Verizon Internet Services	5569	1828	39.6025	-75.6945	26.0	Verizon
Atlantic Broadband	7245	490	39.4757	-75.6724	10.0	Atlantic
Atlantic Broadband	5268	490	39.4757	-75.6724	10.0	Atlantic
Comcast Cable	4922	3400	39.7472	-75.5918	26.0	Comcast
Comcast Cable	4907	1313	40.1172	-74.8495	26.0	Comcast
Comcast Telecommunications	135	780	39.6680	-75.7134	339.0	Comcast
Comcast Cable	778	381	39.7592	-75.5664	26.0	Comcast
Comcast Cable	3182	4079	39.7592	-75.5664	26.0	Comcast
Verizon Internet Services	1220	174	39.9968	-75.1485	26.0	Comcast
Comcast Cable	5088	3619	39.7472	-75.5918	10.0	Comcast
Comcast Cable	2447	2761	39.6025	-75.6945	26.0	Comcast
Comcast Cable	9341	4278	39.6734	-75.7052	31.0	Comcast
Comcast Cable	3022	612	40.6932	-74.2294	43.0	Comcast
Comcast Cable	3231	2889	39.7151	-75.7306	28.0	Comcast
Cavalier Telephone	1926	778	39.6734	-75.7052	89.0	Cavalier
Comcast Cable	7233	6016	39.7151	-75.7306	26.0	Comcast
Comcast Cable	4936	1296	40.6932	-74.2294	50.0	Comcast
AT&T WorldNet Services	1081	623	38.0000	-97.0000	46.0	AT&T
Comcast Cable	250	286	40.6932	-74.2294	53.0	Comcast
WAYPORT	542	200	40.7619	-73.9763	126.0	AT&T
WAYPORT	551	184	40.7619	-73.9763	126.0	AT&T
WAYPORT	431	216	40.7619	-73.9763	120.0	AT&T
WAYPORT	298	204	40.7619	-73.9763	132.0	AT&T
WAYPORT	526	173	40.7619	-73.9763	127.0	AT&T
Comcast Cable	4901	1259	40.6932	-74.2294	36.0	Comcast
Comcast Cable	4907	1380	40.6932	-74.2294	34.0	Comcast
Comcast Cable	12188	3946	39.9407	-75.2281	22.0	Cavalier
Comcast Cable	10765	3979	39.9407	-75.2281	21.0	Cavalier
Verizon Internet Services	11907	4536	39.4757	-75.6724	27.0	Verizon
Verizon Internet Services	12205	4519	39.4757	-75.6724	24.0	Verizon
Level 3 Communications	13478	12481	40.2843	-76.8446	10.0	Comcast
T-MOBILE USA	4117	789	40.1545	-75.3809	124.0	T-Mobile
T-MOBILE USA	3868	789	40.1545	-75.3809	120.0	T-Mobile
Sprint PCS	821	360	40.6195	-74.4247	119.0	Sprint
Sprint PCS	936	356	40.6195	-74.4247	114.0	Sprint
Sprint PCS	736	348	40.6195	-74.4247	118.0	Sprint
Cellco Partnership DBA Verizon Wireless	285	440	40.2269	-75.6452	120.0	Verizon
Cellco Partnership DBA Verizon Wireless	342	356	40.2269	-75.6452	171.0	Verizon
AT&T Global Network Services, LLC	4435	1466	43.0708	-78.8201	135.0	AT&T
AT&T Global Network Services, LLC	5080	1464	43.0708	-78.8201	127.0	AT&T
AT&T Global Network Services, LLC	4851	1503	43.0708	-78.8201	173.0	AT&T
Sprint PCS	931	602	39.2004	-74.7051	106.0	Sprint
Cellco Partnership DBA Verizon Wireless	1096	462	39.9968	-75.1485	136.0	Verizon
Sprint PCS	1211	627	39.2004	-74.7051	100.0	Sprint
Cellco Partnership DBA Verizon Wireless	822	516	39.9968	-75.1485	132.0	Verizon
Sprint PCS	1058	649	39.2004	-74.7051	90.0	Sprint
Cellco Partnership DBA Verizon Wireless	1076	451	39.9968	-75.1485	120.0	Verizon
Sprint PCS	676	410	40.0306	-76.2983	98.0	Sprint
Sprint PCS	805	38	40.0306	-76.2983	421.0	Sprint
Sprint PCS	484	408	40.0306	-76.2983	507.0	Sprint
Service Provider Corporation	2898	1197	38.0000	-97.0000	129.0	AT&T
AT&T Global Network Services, LLC	3315	1157	38.8782	-77.1054	310.0	AT&T

AT&T Global Network Services, LLC	4006	1546	38.8782	-77.1054	119.0	AT&T
Cellco Partnership DBA Verizon Wireless	302	419	39.9566	-75.6162	175.0	Verizon
Cellco Partnership DBA Verizon Wireless	452	445	39.9566	-75.6162	159.0	Verizon
AT&T Global Network Services, LLC	2154	177	39.8062	-86.1407	149.0	AT&T
AT&T Global Network Services, LLC	2225	317	39.8062	-86.1407	136.0	AT&T
Cellco Partnership DBA Verizon Wireless	2156	463	39.9566	-75.6162	151.0	Verizon
Cellco Partnership DBA Verizon Wireless	2461	694	39.9566	-75.6162	170.0	Verizon
Sprint PCS	416	96	40.6195	-74.4247	147.0	Sprint
Sprint PCS	967	73	40.6195	-74.4247	135.0	Sprint
Cellco Partnership DBA Verizon Wireless	2611	537	40.0548	-75.4083	131.0	Verizon
Cellco Partnership DBA Verizon Wireless	2476	600	40.0548	-75.4083	150.0	Verizon
Sprint PCS	123	63	41.1879	-73.8315	197.0	Sprint
Sprint PCS	212	22	41.1879	-73.8315	197.0	Sprint
Sprint PCS	965	225	39.4238	-75.2577	96.0	Sprint
Sprint PCS	762	306	39.4238	-75.2577	88.0	Sprint
Sprint PCS	1792	262	39.4238	-75.2577	148.0	Sprint



Delaware

N
0 5 10 15 Miles
Field Verification Interview Points

● Field Verification Interview Point



LatDD	LonDD	Provider
38.90623300000	-75.41091666670	Sprint
39.66100000000	-75.66100000000	ATT
39.66648333330	-75.66271666670	Sprint
39.72038333330	-75.66348333330	Sprint
39.72038333330	-75.66348333330	ATT
39.50113333330	-75.64875000000	ATT
39.50113333330	-75.64875000000	Sprint
38.52201666670	-75.06033333330	Sprint
38.52201666670	-75.06033333330	Verizon
38.46491666670	-75.05311666670	Verizon Wireless
39.15926666670	-75.57238333330	ATT
39.15926666670	-75.57238333330	Sprint
39.18040000000	-75.58796666670	ATT
39.18040000000	-75.58796666670	Sprint
39.18106666670	-75.52860000000	Sprint
39.18110000000	-75.52863333330	ATT
39.10250000000	-75.54281666670	Sprint
39.10250000000	-75.54281666670	ATT
38.53436666670	-75.21248333330	Verizon
38.53436666670	-75.21248333330	Sprint
38.55483333330	-75.24133333330	Verizon
38.61588333330	-75.58875000000	Sprint
38.61588333330	-75.58875000000	Verizon
38.59721666670	-75.61483333330	Verizon
38.59721666670	-75.61483333330	Sprint
38.56853333330	-75.57335000000	Sprint
38.56853333330	-75.57335000000	Verizon
38.66520000000	-75.61083333330	Sprint
38.66520000000	-75.61083333330	Verizon
38.72440000000	-75.12563333330	Sprint
38.72440000000	-75.12563333330	ATT
38.72440000000	-75.12563333330	Verizon
38.77128333330	-75.65388333330	ATT
38.71765000000	-75.71765000000	Sprint
38.80270000000	-75.58531666670	Sprint
38.80270000000	-75.58531666670	Verizon
38.98686666670	-75.66365000000	Verizon
38.98686666670	-75.66365000000	Sprint
38.98686666670	-75.66365000000	ATT
39.02210000000	-75.64563333330	Sprint
39.10165000000	-75.63556666670	Verizon
39.10165000000	-75.63556666670	Sprint
39.10165000000	-75.63556666670	ATT
39.14686666670	-75.67130000000	ATT
39.14686666670	-75.67130000000	Sprint
39.13245000000	-75.54086666670	Verizon
39.28845000000	-75.61463333330	Sprint

39.293033333330	-75.62070000000	Sprint
39.341333333330	-75.60800000000	Sprint
39.341333333330	-75.60800000000	Verizon
39.13245000000	-75.54086666670	Sprint
39.13245000000	-75.54086666670	ATT
39.270333333330	-75.58735000000	Verizon
39.270333333330	-75.58735000000	Sprint
39.270633333330	-75.58663333330	ATT
39.28845000000	-75.61463333330	ATT
39.43561666670	-75.69373333330	Verizon
39.43561666670	-75.69373333330	ATT
39.43561666670	-75.69373333330	Sprint
39.47631666670	-75.72048333330	Verizon
39.63326666670	-75.66098333330	ATT
39.67596666670	-75.70468333330	Sprint
39.67596666670	-75.70468333330	T-Mobile
39.67596666670	-75.70468333330	Cricket
39.73516666670	-75.63361666670	T-Mobile
39.77881666670	-75.59780000000	Cricket
39.77881666670	-75.59780000000	T-Mobile
39.77881666670	-75.59780000000	Sprint
39.77881666670	-75.59780000000	Verizon
39.29186666670	-75.63151666670	Sprint
39.29186666670	-75.63151666670	Verizon
39.39101666670	-75.71823333330	Verizon
38.89251666670	-75.69101666670	Verizon
38.88923333330	-75.67901666670	Verizon
38.89278333330	-75.63633333330	Verizon
38.88893333330	-75.63503333330	Verizon
38.65360000000	-75.53511666670	ATT
38.65360000000	-75.53511666670	Sprint
39.09808333330	-75.54463333330	Verizon
38.61393333330	-75.14621666670	Verizon
38.61393333330	-75.14621666670	ATT
38.46251666670	-75.05201666670	ATT
39.18116666670	-75.58981666670	Sprint
39.18116666670	-75.58981666670	ATT
39.17770000000	-75.60801666670	Sprint
39.17770000000	-75.60801666670	ATT
39.10981666670	-75.54531666670	Sprint
39.10981666670	-75.54531666670	ATT
38.57508333330	-75.06076666670	Sprint
38.57508333330	-75.06076666670	Verizon
39.50113333330	-75.64873333330	Verizon
39.44898333330	-75.64876666670	ATT
39.44898333330	-75.64876666670	Sprint
38.87248333330	-75.41900000000	Sprint
39.45225000000	-75.69003333330	ATT
39.45225000000	-75.69001666670	Sprint

38.46106666670	-75.22020000000	Verizon
38.46106666670	-75.22020000000	ATT
38.46106666670	-75.22020000000	Sprint
38.74353333330	-75.18695000000	Sprint
38.74353333330	-75.18695000000	Verizon
38.74353333330	-75.18695000000	ATT
38.65223333330	-75.21021666670	Verizon
38.65223333330	-75.21021666670	Sprint
38.54113333330	-75.59121666670	Sprint
38.54113333330	-75.59121666670	Verizon
38.55396666670	-75.54876666670	Sprint
38.57058333330	-75.34620000000	Verizon
38.57058333330	-75.34620000000	ATT
39.09808333330	-75.54463333330	Sprint
39.09808333330	-75.54463333330	ATT
39.03938333330	-75.55946666670	ATT
39.03938333330	-75.55946666670	Verizon
39.03938333330	-75.55946666670	Sprint
39.06890000000	-75.47453333330	Sprint
38.80885000000	-75.69755000000	Sprint
38.87395000000	-75.71740000000	Sprint
38.53508333330	-75.07023333330	Verizon
39.57085000000	-75.58751666670	Sprint
39.57085000000	-75.58751666670	Verizon
39.57085000000	-75.58751666670	ATT
39.71013333330	-75.56236666670	Cricket
39.71013333330	-75.56236666670	T-Mobile
39.71013333330	-75.56236666670	Verizon
39.71013333330	-75.56236666670	Sprint
39.71013333330	-75.56236666670	ATT
39.67596666670	-75.70468333330	Verizon
39.39101666670	-75.71823333330	ATT
39.57408333330	-75.59630000000	Sprint
39.57408333330	-75.59630000000	Verizon
39.57408333330	-75.59630000000	T-Mobile
39.57408333330	-75.59630000000	Cricket
39.57948333330	-75.58751666670	T-Mobile
39.48231666670	-75.65085000000	Cricket
39.48231666670	-75.65085000000	ATT
39.48231666670	-75.65085000000	T-Mobile
39.48231666670	-75.65085000000	Sprint
39.48231666670	-75.65085000000	Verizon
39.57948333330	-75.58751666670	Cricket
38.71578333330	-75.09328333330	Sprint
38.65360000000	-75.36845000000	Verizon
38.92830000000	-75.58051666670	Verizon
38.92830000000	-75.58051666670	Sprint
38.77128333330	-75.65388333330	Sprint
38.77128333330	-75.65388333330	Verizon

39.00828333330	-75.57528333330	Verizon
39.00828333330	-75.57528333330	Sprint
39.00828333330	-75.57528333330	ATT
38.71576666670	-75.09330000000	ATT
39.17283333330	-75.50958333330	ATT
39.17283333330	-75.50958333330	Sprint
38.65908333330	-75.57385000000	Sprint